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Problem Amidst Plenty: A Paradox of BBIN Sub-Region

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Abstract: Together, Bangladesh, Bhutan, India and Nepal (BBIN) are the home of 21 per cent of world's population and a significant proportion of the society does not have access to modern energy on grounds of both accessibility and affordability. Even though the region as a whole is enriched with assorted energy resources, with enough potential in renewable energy field, a lion's share of these resources are yet to be exploited. So, these countries are importing a considerable amount of energy resources from other countries or regions to meet their increasing energy requirements. This high dependence on imports of primary resources of energy and constant power shortage has been major factors in keeping the region at low growth equilibrium. To cope up with these concerns, there is an urgent need exploit the opportunities to boost the energy cooperation among these countries. Electricity has potential to replace the other energy resources in the energy basket. Collectively these countries have hydro power potential of 263 GW. The mismatch in resource endowments and demand-supply situation presents prospects for energy trade to obtain optimum advantage from available resources in the region. The mutual co-operation among these countries can be a win-win situation for all. The present study aims to analyze the opportunities, benefits and challenges to power trade among these Countries.

1. INTRODUCTION

South Asian Association of Regional Cooperation (SAARC) got established in 1985 with the objectives of accelerating economic growth, social progress and cultural development in the South Asian region. Due to number of reasons including the unending political rivalries between the two largest member countries, SAARC did not really kick off the much expected regional economic integration. This disappointed the member states and pushed some of these to look for alternative ways to achieve the desired outcomes. During 1996, Nepal formally proposed to form a South Asian Growth Quadrangle (SAGQ) consisting Bangladesh, Bhutan, India, Nepal (BBIN) during the SAARC Foreign Ministers conference (Shukla, 2019). The proposal got immediately approved by all the concerned members but Maldives, Sri Lanka and Pakistan raised serious suspicions before agreeing to it. Further in 1997, the objectives, principles and plan of action were adopted for this growth quadrangle by the Foreign Secretaries of SAARC. These state specifically identified six sectors- transport and communication, energy, trade and investment facilitation, tourism, utilization of natural resource endowment and environment. This initiative could not take off initially but in recent years the governments of BBIN region has realized the need of this cooperation specifically in energy sector.

Together BBIN countries are home to 21 per cent of world's population. And this sub-region is typically characterized by moderate economic growth coupled with problems of unemployment and poverty, dependence on imports and predominance of fossil fuels in the energy consumption. Even though these countries are well endowed with clean energy resources but still predominantly depends on fossil or mainly dependent on single energy resource for electricity generation. Bangladesh and India are highly dependent on fossil fuels for electricity generation on the other hand more than 90 per cent of electricity in being generated by hydro resources in Nepal and Bhutan (IRADe, 2018). This unbalanced energy mix cannot be sustainable in long run. Moreover all these countries are developing countries and continuously trying to achieve the desired goals of development. There is formidable relation between economic development and energy demand because energy, investment and industrialization are intertwined. But these countries lagged far behind their developed counterpart in terms of access to clean, reliable and affordable energy, especially power. Strengthening cross-border power trade co-operation among these countries can be the part of solution for providing adequate and reliable electricity availability. Even though the region as a whole is enriched with assorted energy resources, with enough potential in renewable energy field, a lion's share of these resources are yet to be exploited.

Looking at the significant variation in natural resources and demand across the region, the interconnection among the power system of these countries present a wonderful opportunity towards resource optimization as well as energy security. Towards this the power systems of India, Nepal and Bhutan are operating in interconnect synchronized mode for quite some time and the recent developments in India-Bangladesh has opened a new chapter in cross border power exchange.

2. THE OVERVIEW OF ELECTRICITY SECTOR IN BBIN SUB-REGION: COMPOSITION AND USAGE PATTERN

There are significant diversities in the social and economic profile of BBIN region. While India has the highest population and Bhutan has lowest population. In terms of openness to trade, Bhutan's total trade was 79 per cent of its GDP during 2017 which was highest compared to other countries in this region (World Bank, 2019). All these countries of BBIN are developing countries and must work to meet the increasing demand for energy as they develop their industrial, business, transport and service sector.

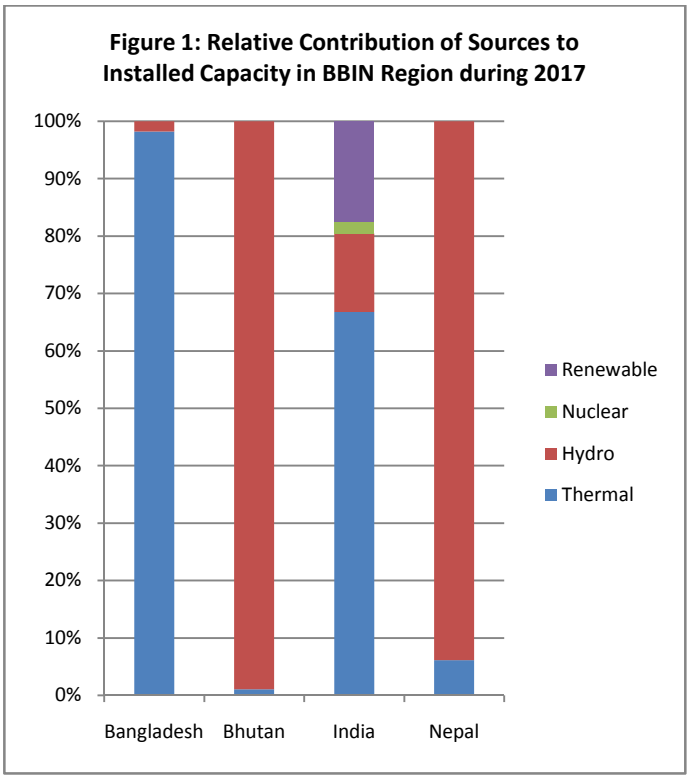
Table-1 shows the current power scenario of countries of BBIN region. None of the countries have achieved hundred per cent electrification rate. Among the countries of this sub-region, Bhutan has the highest per capita electricity consumption at 2902 kwh/capita followed by India 701 Kwh/capita during 2017. Low population compared to other member countries in the BBIN sub-region is one of the key reasons for the high per capita electricity consumption. Bhutan is the only country which is generating surplus power in the region.

TABLE 1: Power Sector during 2017

	Bangladesh	Bhutan	India	Nepal
Electricity Access %	88	97	92	95.5
Installed capacity (MW)	15953	1631	302087	830
T. Generation (Mn Kwh)	52620	7959	1116850	4083
T. Consumption (Mn Kwh)	50264	2177	948328	4777
Per Capita Electricity Consumption	312	2902	701	170

Source: Asian Development Bank, 2018.

Energy supply and security is the major issues for the development of South Asian countries. Fossil fuel is the most predominant source of electricity generation in the BBIN sub-region. In Bangladesh approximately 98.2 per cent (12725 MW) of total installed capacity has been contributed by thermal resources in which natural gas dominates and in India coal is dominating fuel to generate electricity. Nepal and Bhutan are majorly dependent on hydropower as more than 90 per cent their installed capacity is based on hydropower plants. These countries depend on single source for electricity generation but such dependence is not sustainable. Nepal and Bhutan both enjoy the supremacy over hydropower potential but they have not harnessed the available hydropower potential in their boundaries. Harnessing this hydropower potential in these countries can reduce the import dependence for fossil fuels from other regions.



To catch up the increasing energy demand in the region these countries are already trying to strengthen cross border power cooperation. Energy cooperation in this sub-region exists at bilateral level and benefitted the participating nations only. In case of India and Bhutan, former provided technical and financial assistant to latter to develop hydropower and presently that form of energy is Bhutan's main export to India. The export of electricity accounts 38 per cent of Bhutan's total export to India. Hydropower sector contributed 13.19 per cent to the GDP of being during 2017 (Royal Monetary Authority, 2018). India and Bangladesh signed MoU in 2010 to exchange electricity through cross-border grid connectivity and to jointly invest in power generation in Bangladesh. Presently, Bangladesh is importing 500 MW and 100MW from India through Bharampura-Bheramera and Tripura-Comilla interconnections respectively. Bangladesh is also planning to import another 100 MW from Manarchak thermal plant in west Tripura (BPDB, 2018). As far as India and Nepal is concerned, they are also engaged in significant energy cooperation. Four hydroelectric schemes with an aggregated installed capacity of about 50 MW have been implemented in Nepal with assistance from India. There are possibilities of expansion this cooperation between India and Nepal as till date only 830MW of hydropower has been developed against Nepal's economically feasible hydropower potential of about 43000 MW. However, tensions between India and Nepal endangered the possibility of greater energy cooperation between them.

3. PROSPECTS FOR POWER TRADE

All BBIN countries are focused on development of service sector, industrial sector and infrastructure which is highly dependent on supply of electricity. Rapid urbanisation is also a reason of increasing demand of electricity in the region. In spite of all efforts, the region is power hungry yet. Domestically these countries are not able to meet their energy requirements. But the mismatch between energy demand and resource endowments in individual countries builds a strong case for energy cooperation. Presently, power trade is taking place at bilateral level which has benefitted the participating nations only. Turning this bilateral trade into multilateral level will lead to an optimum utilisation of available resources in the region. Looking at the significant variation in natural resources and demand across the region, the interconnection among the power system of these countries present a wonderful opportunity towards energy security in this sub-region.

Oil reserves have always been a constraint for this region. So these countries remained depend on oil imports. The natural gas reserves in Bangladesh and India are also sizeable as estimated reserves of gas are 8 and 39 trillion cubic meters, respectively. But these reserves cannot be seen as a dependable source for long term planning. India is fourth largest producer of coal in the world and presently uses coal as a primary commercial fuel for electricity generation. Bangladesh also has some limited coal reserves. Hydro-power potential is also quite high in the region, as estimated potential of power generation in the region is approximately 263 GW (Rehaman et al. 2011). Two mountainous countries, Nepal and Bhutan have the potential to produce surplus power from hydro-electric plants which are far in excess of their present of projected demand. But all these hydro-power projects are capital-intensive projects, so high investments is the only barrier for them to produce to produce surplus power.

Table-2 shows the Prospects for Electricity Trade in BBIN sub-region. India is already importing Hydropower from Bhutan and there are possibilities to import from Nepal, Bangladesh. Bhutan can get a dry season support from India and there are some possibilities exist for an interconnection between Bangladesh and Bhutan via India and similarly for Nepal. Presently Bangladesh is importing Electricity from India. And there are possibilities to import hydropower from Nepal and Bhutan with an interconnection via India.

TABLE 2: Prospects for Electricity Trade in BBIN Region

Importing Countries	**Exporting Countries**			
	India	**Bhutan**	**Nepal**	**Bangladesh**
India	X	Significant quantities of Hydro Power	Significant hydro power export possible	Significant amount of gas.
Bhutan	Dry season support	X	Unlikely- Similarity of resources & seasonal shortages	Small amount of thermal power & gas. Connection via India
Nepal	Thermal power support. Dry season support	Unlikely. Similarity of resources & seasonal shortages	X	Small amount of thermal power & gas. Connection via India
Bangladesh	HVDC b2b link	Some hydro power. Link via India	Some hydro power. Link via India	X

4. BARRIERS TO CROSS-BORDER ELECTRICITY COOPERATION

Regional agreement for power sector cooperation and trade may take time to achieve. For example, realization of the Central American Power Market took 23 years from the time the feasibility study was completed. Similarly electricity sector cooperation in Greater Mekong Sub-region (GMS) also witnessed a timeline spread over two decades, and still continues to evolve (Anoop et. el, 2015). BBIN countries are also putting efforts in the same direction. Successful energy trade requires a consensus among participating nations on the distribution of project benefits and costs. They also need to link the national and regional institutions and mobilize adequate package of grants, credits and loan finances for the realization of the plans. Presently, energy trade between these countries is facing several barriers. Some of these are discussed here briefly.

- **Political Barriers:** Internal political conflicts and unstable governments in the nations have slowed down the process of regional electricity cooperation. In addition government-to-government model for cross-border trade typically involve prolonged political as well as technical negotiations which diminish the economic gains. Regional cooperation for electricity has been alleged by some as a threat to national safety and energy security.
- **Institutional Barriers:** Besides SAARC, there is no other institution and legal framework to promote regional cooperation in energy sector among BBIN countries. During 2004, initiative has been taken to enhance the energy cooperation in the region but no strong progress has

been made so far in power trade. Recently, some initiative such as United States Agency for International Development (USAID's), South Asia Regional Initiative for Energy Cooperation (SARI/E), Asian Development Bank (ADB) etc. have also included cooperation in energy trade as one of the thematic area.

- **Regulatory Barriers:** Although all countries have recognised the need and possibilities of regional trade in energy, but the existing regulatory and pricing policy do not addresses the prospect of regional power trade. There is no homogeneity in determining the prices to promote cooperation at regional level. There is a need to harmonize the regulatory provision of the respective countries to come forward for the cooperation.
- **Technical Barriers:** The infrastructure hardly exists at the regional level except for few power grid interconnections between Bhutan-India, Nepal-India and Bangladesh-India. The BBIN countries except India are handicapped by the lack of experts needed in adopting technology for generating energy from the available possible energy sources. This has severe adverse implication in developing large projects in countries like Bangladesh, Bhutan etc. Only India has a strong technical and planning capability in this area, which can be shared with other countries.
- **Financial Barriers:** Financial barriers are most frightening in extracting and exploring non renewable energy resources. A vast investment is needed to develop the untapped regional energy resources such as hydropower and gas. Individual countries cannot afford to exploit the available resources at their own levels.

5. POLICY SUGGESTIONS

There are many barriers to increase cross-border cooperation such as policy, institutional, political, financial etc. There is a need to address these barriers to enhance power trade in BBIN sub-region. Firstly, to improve cross-border power trade these states have to commit to a common agreement that can be helpful to build up a basic framework to develop regional energy trade followed by developing an intergovernmental agreement to promote specific energy trade initiatives in the region. Secondly, the energy markets in individual states of this sub-region are governed by the individual legal, regulatory and policy frameworks. There is a need to harmonize the relevant frameworks. The legal, policy and regulatory risks proliferate in the case of cross border transaction as the trade arrangements need to deal with multiple frameworks.

The risks are further increased by the fact that the investments required in such projects are sizable so investors need to be given an assurance of return on investment. To alleviate these risks the region needs to move towards a common legal and regulatory framework to govern the cross border transactions. The projects undertaken to enhance the cooperation are capital intensive in nature. Hence, mobilization of finances for these projects is an essential to materialize the cooperation. At present, in these countries energy sector is being operated by publically owned utilities and they are not in good financial conditions for a variety of reasons. To address this problem public-private-partnership (PPP) can be an option.

6. CONCLUSION

The mismatch between energy demand and resources endowments in individual countries builds a strong case for energy cooperation. Presently, the existing cross-border electricity trade in BBIN is bilateral in nature and have benefitted the participating nations only. The bilateral arrangements between India-Bhutan and India-Nepal for generation and transmission system have provided opportunities to unleash the huge hydropower potential available in both Bhutan and Nepal. More recently the development and growth in India-Bangladesh power trade has opened the new avenues for a collaborative regional market. But there are many barriers to increase the cross border power trade such as institutional, political, financial etc which needs to be addressed. Moreover, the energy markets in individual states are governed by the individual legal, regulatory and policy framework which hinder the progress of power trade in the region. There is a need to harmonize the relevant frameworks. Other than this, the geopolitics involved and competition from alternative markets make this venture a challenging proposition. The cooperation to harness natural resources to generate electricity already exists between these countries but still there is a long way to go.

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